

4/1



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



Publication number: **0 419 235 A1**

12

## EUROPEAN PATENT APPLICATION

21 Application number: **90310259.8**

51 Int. Cl.<sup>5</sup>: **A61B 17/39**

22 Date of filing: **19.09.90**

The title of the invention has been amended  
(Guidelines for Examination in the EPO, A-III,  
7.3).

30 Priority: **19.09.89 GB 8921132**

43 Date of publication of application:  
**27.03.91 Bulletin 91/13**

64 Designated Contracting States:  
**BE DE ES FR GB IT NL SE**

71 Applicant: **Rocket of London Limited**  
**Imperial Way**  
**Watford, Hertfordshire WD2 4XX(GB)**

72 Inventor: **Robson, Richard**  
**17 Henson Close, Glebe**  
**Washington, Tyne & Wear(GB)**  
Inventor: **Bartlett, Jonathan Easton**  
**25 Merley Gate**  
**Morpeth, Northumberland, NE61 2EP(GB)**

74 Representative: **Pattullo, Norman et al**  
**Murgitroyd and Company Mitchell House 333**  
**Bath Street**  
**Glasgow G2 4ER(GB)**

54 **Loop electrode.**

57 A medical instrument (3) and a method of making a medical instrument (3) for use in diathermy is described. The medical instrument (3) has a cutting member (5) and a support member (4). Both the support member (4) and the cutting member (5) are electrically conducting and the support member (4) is tubular so that two ends of the cutting member (5) may be received within an end of the support member (4). The two ends of the cutting member (4) are secured to the end of the support member (4) so that there is an electrical connection between the support member (4) and the cutting member (5). The cutting member is preferably a wire which is less than 0.01" thick. Typically, insulation (7,8) is also provided around a portion of the support member (4) and a portion of the cutting member (5). The insulation may include a plastic shrink-fitted sleeve (7) and a plastics material (8) which is moulded around the end of the support member (4) which receives the two ends of the cutting member (5).

EP 0 419 235 A1

## A MEDICAL INSTRUMENT

This invention relates to a medical instrument for use in diathermy.

In medicine, heat can be applied to the human body by high frequency currents in a process known as diathermy. Diathermic surgery involves the use of an electric current passing, for example, through a blade, forceps or thin wire in preference to a knife for cutting through tissue, and has the advantage of sealing the blood vessels at the cut and so reducing bleeding.

Diathermy is particularly appropriate for treatment of cervical disease. Iodine is used to stain the tissue of the cervix and the malignant cells show up as white patches. These cells can be excised by carrying out a biopsy using a diathermy loop, in the form of a re-usable hand-held instrument.

Figs. 1a and 1b show front and sectional views respectively of a typical diathermal instrument of the prior art. A solid metal rod 1 is welded to a metal tube 2 to form a T-junction. Wire 3 is looped from one end of the tube 2 to the other and the tube ends are stamped down around the wire ends to give the end product.

This instrument has disadvantages in that the wire may break at its connection to the tube and in order to provide sufficient mechanical strength the wire used is generally at least 0.010" thick. However, it would be desirable to use thinner wire as such wire produces a more effective cutting action. Also, the welding point makes the production of the instrument costly.

According to the present invention there is provided a medical instrument for use in diathermy comprising a cutting member and a support member, both of the members being electrically conducting, and wherein the support member is tubular and the cutting member has two ends both of which are received within one end of the support.

Further according to the present invention there is provided a method of making a medical instrument for use in diathermy comprising inserting opposite ends of a cutting member into one end of a support member, both the members being electrically conducting and securing the ends in position so that an electrical connection is made.

Typically, the support member may be a metal tube which provides a handle for the instrument.

Typically, said cutting member is a wire, as it presents the same cutting surface to the tissue, no matter how it is manipulated. Preferably, the cutting member is less than 0.010" thick, to give a more effective cutting action and most preferably is 0.006" thick as this gives the best combination of mechanical strength and cutting action.

Preferably, said instrument is provided with in-

ulating means to prevent a patient or doctor receiving an electric shock.

The insulating means preferably includes sleeves covering the cutting member adjacent the point where it is received by the support member, and may also include a sheath which covers a length of the support member and is shrink-fitted on to the support member.

Preferably also, an insulating moulding is made from plastics material which joins the end of the sheath to the sleeves. Most preferably, said moulding has a webbed portion which spans the area between the two sleeved sections of the cutting member, as this provides a limit to the depth of excision.

Embodiments of the invention will now be described with reference to the drawings in which:

Fig.2a is a front view of a first embodiment of a medical instrument for use in diathermy of the present invention;

Fig.2b is a cross-section on B-B of Fig.2a; and

Fig.3 is a front view of a second embodiment of a medical instrument for use in diathermy of the present invention.

A first medical instrument 3 for use in diathermy (Fig. 2) comprises a support member in the form of a metal tube 4 and a cutting member in the form of a wire 5. Both ends of the wire 5 are received by the tube 4 and sections of the wire 5 adjacent the tube 4 are covered in plastic shrink-fitted sleeves 7. A plastic shrink-fitted sheath 6 covers part of the tube 4. The sleeves 7 are in turn enclosed in a nylon moulding 8, which covers the connection between the wire 5 and the tube 4 and completes the insulation so that it is continuous.

A second medical instrument for use in diathermy is shown in Fig.3. Features in common with the first are given the same number plus 100, eg, 4=104. This instrument 103 has a moulded nylon section 108 which extends along the plastic sleeves 107 of the wire 105 to form a web 9.

These instruments are made by taking a stainless steel wire 0.15mm thick, threading a shrink-plastics sleeve on to each end, whilst leaving the ends themselves clear of the sleeve, inserting the ends of the wire into one end of a stainless steel tube 13G x 100mm long and flattening the tube so that the ends of the wire are trapped and an electrical connection is made. A moulding of low density polyethylene is made around the junction between the wires and tube which contacts the plastics sleeves and so the wire itself does not touch the wall of the mould. The mould may be extended to give the web feature of the second embodiment. The wire loop may have a diameter

of 15, 20 or 25mm depending on requirements.

In use, the instrument is attached to an electrical source, the wire heats up and is used to cut away tissue as required. The web 9 acts as a guide when using the instrument in that it limits the depth to which the instrument can cut. 5

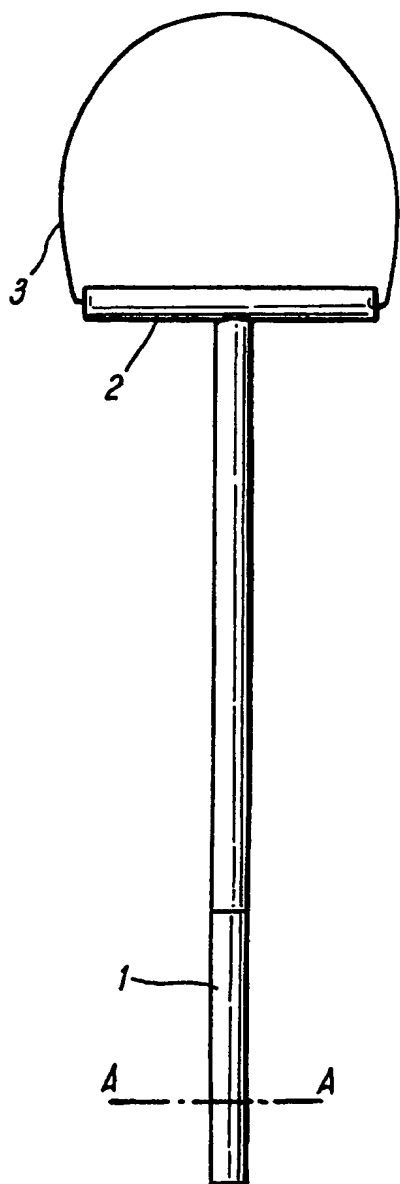
The construction of the diathermal instrument of the present embodiment confers many advantages upon it. The instrument can be made at a lower cost than a re-usable instrument and is more effective as it has a steel wire almost half the diameter of the wire used in the prior art. The instrument is thus rendered more precise and effective than the conventional instruments. 10

Because the present invention is less expensive it may be provided as a disposable instrument which eliminates the problem of transfer of infection from inadequately-cleaned instruments. 15

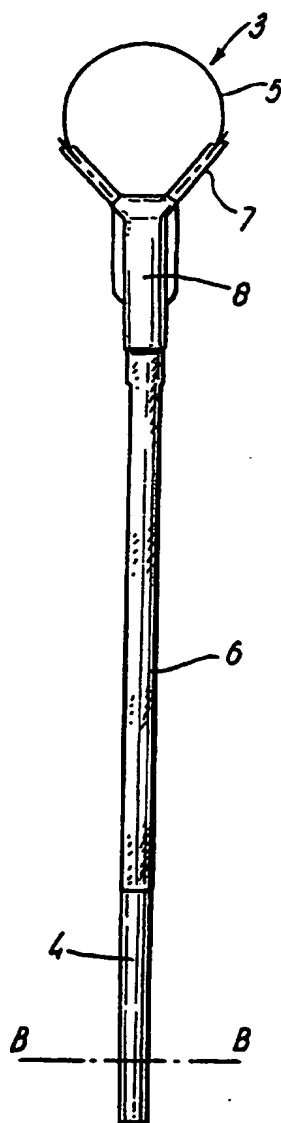
Modifications and improvements may be incorporated without departing from the scope of the invention. 20

## Claims

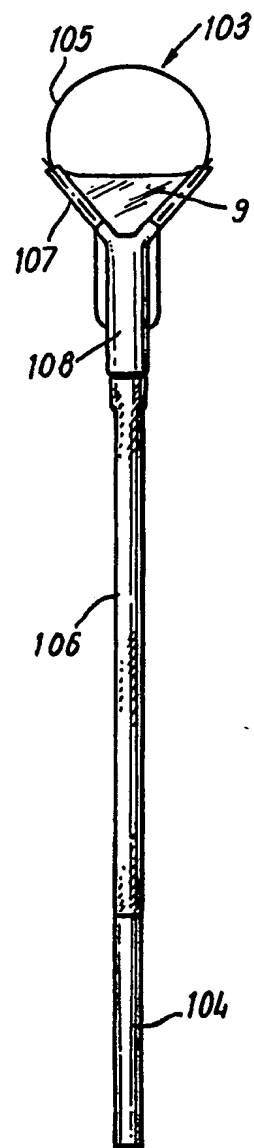
1. A medical instrument for use in diathermy comprising a cutting member (5) and a support member (4), both of the members (4,5) being electrically conducting, and wherein the support member (4) is tubular and the cutting member (5) has two ends both of which are received within one end of the support (4). 25
2. A medical instrument according to Claim 1, wherein the cutting member (5) is a wire. 30
3. A medical instrument according to Claim 1 or Claim 2, wherein the cutting member (5) is less than 0.01" thick. 35
4. A medical instrument according to Claim 3, wherein the cutting member (5) is substantially 0.006" thick. 40
5. A medical instrument according to any of the preceding claims, the instrument further comprising insulating means (7,8). 45
6. A medical instrument according to Claim 5, wherein the insulating means (7,8) covers a portion of the cutting member (5) adjacent to the support member (4). 50
7. A method of making a medical instrument for use in diathermy comprising inserting opposite ends of a cutting member (5) into one end of a support member (4), both the members (4,5) being electrically conducting and securing the ends in position so that an electrical connection is made. 55
8. A method according to Claim 7, the method further comprising moulding an insulating material (8) around the one end of the support member (4) and a portion of the cutting member (5) which is adjacent to the support member (4).



**Fig. 1a**



**Fig. 2a**



**Fig. 3**



**Fig. 1b**



**Fig. 2b**



European  
Patent Office

# EUROPEAN SEARCH REPORT

Application Number

EP 90 31 0259

| DOCUMENTS CONSIDERED TO BE RELEVANT   |   |  |   |
|---|---|--|---|
| Category  | Citation of document with indication, where appropriate, of relevant passages   | Relevant to claim                              | CLASSIFICATION OF THE APPLICATION (Int. Cl.5) |
| X   | DE-C-8 482 33 (HEYNEMANN)<br>* Whole document *<br>- - - -  | 1,2,5,7  | A 61 B 17/39                                  |
| A   |   | 3,4,6,8  |   |
| A   | US-A-3 807 404 (WEISSMAN)<br>* Column 3, line 47 - column 4, line 27; figure 1 *<br>- - - -   | 1-5  |   |
| A   | ELECTROMEDICA, vol. 41, no. 2, February 1983, pages 64-67; E. HOHMANN: "Das Sirotom ein Elektrochirurgiegerät für die Zahnheilkunde"<br>* Whole document *<br>- - - - | 1-5  |   |
| A   | DE-A-3 247 793 (MASLANKA)<br>* Page 10, line 20 - page 13, line 5; figures 1-3 *<br>- - - - -   | 1,7,8  |   |
|   |   |  | TECHNICAL FIELDS SEARCHED (Int. Cl.5)         |
|   |   |  | A 61 B  |
| The present search report has been drawn up for all claims  |   |  |   |
| Place of search<br>The Hague  |   | Date of completion of search<br>15 November 90 | Examiner<br>SCHMIERER U.J.                    |
| <div>CATEGORY OF CITED DOCUMENTS</div> <div>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document<br/>T : theory or principle underlying the invention</div> <div>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>&amp; : member of the same patent family, corresponding document</div> |   |  |   |